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SLR:dm 04/04/06 5585-70293-01 508626 MON/P100681US

PATENT  
Attorney Reference No. 5585-70293-01

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**FILE COPY****In re application of:** Boden et al.**Application No.** 10/521,628**Filed:** September 8, 2005**Confirmation No.** 2023**For:** BETA SHEET TAPES RIBBONS IN TISSUE ENGINEERING**Examiner:** Not yet assigned**Art Unit:** 1712**Attorney Reference No.** 5585-70293-01**REQUEST FOR CORRECTED OFFICIAL FILING RECEIPT****TO:** Kathy Short

Fax No. 703-305-3230

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U.S. Patent and Trademark Office

(TOTAL PAGES TRANSMITTED: 15)

An error appears in the official Filing Receipt issued for the above-identified patent application, as follows:

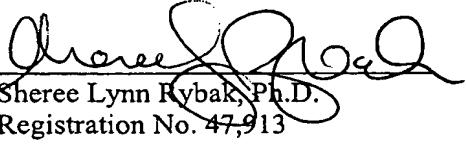
The title of the application should be:

--BETA SHEET TAPES RIBBONS IN TISSUE ENGINEERING--

Attached hereto is a copy of the official Filing Receipt with the requested correction shown thereon. Also attached is a copy of the Preliminary Amendment that was submitted on January 13, 2005 with the first submission of items concerning a filing under 35 U.S.C. § 371. The title was amended in the Preliminary Amendment.

Please correct the identified error and issue a corrected official Filing Receipt.

I hereby certify that this paper and the documents referred to as being attached or enclosed herewith are being facsimile transmitted to fax number 703-305-3230 on the date shown below.

  
Sheree Lynn Rybak, Ph.D.  
Registration No. 47,913April 4, 2006  
Date

cc: Docketing

H.G.F./SLR



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APPL NO.	FILING OR 371 (C) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/521,628✓	09/08/2005 ✓	1712 ✓	1290	5585-70293-01 ✓	10 ✓	51 ✓	1 ✓

24197✓  
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## CONFIRMATION NO. 2023✓

## FILING RECEIPT



\*OC000000018321966\*

Date Mailed: 03/20/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

## Applicant(s)

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 Eileen Ingham, Leeds, UNITED KINGDOM;✓  
 Jennifer Kirkham, Leeds, UNITED KINGDOM;✓

Power of Attorney: The patent practitioners associated with Customer Number 24197. ✓

## Domestic Priority data as claimed by applicant

This application is a 371 of PCT/GB03/03016 07/15/2003 ✓

## Foreign Applications

UNITED KINGDOM 02162865 07/15/2002 ✓

Projected Publication Date: 06/29/2006 ✓

Non-Publication Request: No ✓

Early Publication Request: No ✓

\*\* SMALL ENTITY \*\* ✓

Title

~~Networks~~ **BETA SHEET TAPES RIBBONS IN TISSUE ENGINEERING**

Preliminary Class

428

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WDN/SLR:dm 01/13/05 344434  
PATENTExpress Mail No. EV514612960US  
Date of Deposit: January 13, 2005  
Attorney Reference Number 5585-70293-01  
Application Number Currently Unknown

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**In re application of:** Neville Boden, Amalia Agelli,  
Eileen Ingham, and Jennifer Kirkham

**Application No.** Currently unknown

**Filed:** Herewith

**Confirmation No.** Currently unknown

**For:** BETA SHEET TAPES RIBBONS IN  
TISSUE ENGINEERING

**Examiner:** Not yet assigned

**Art Unit:** Not yet assigned

**Attorney Reference No.** 5585-70293-01

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**PRELIMINARY AMENDMENT**

Prior to examination of the above-identified patent application, please amend the application as follows to comply with national stage requirements.

**Amendments to the Specification** are on page 2.

**Amendments to the Claims** are reflected in the listing of claims, which begins on page 3.

**Remarks** are on page 11.

An Abstract is attached as a separate page at the end of this document.

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**Amendments to the Specification**

On page 1, line 1, please amend the title of the invention to read as follows:

~~--BETA SHEET TAPES RIBBONS IN TISSUE ENGINEERING NETWORKS--~~

On page 1, please insert the following paragraph beginning on line 3:

--This is the U.S. National Stage of International Application No. PCT/GB2003/003016, filed July 15, 2003 (published in English under PCT Article 21(2)), which in turn claims the benefit of Great Britain patent application no. 0216286.5 filed July 15, 2002.--

Please insert the Abstract, submitted herewith on a separate page, as page 42 at the end of the application.

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Claims

1. (currently amended) A material comprising ribbons, fibrils or fibres, wherein characterised in that each of the ribbons, fibrils or fibres have an antiparallel arrangement of peptides in a  $\beta$ - sheet tape-like substructure.
2. (currently amended) A The material according to claim 1, wherein characterised in that the peptide is selected from the group P11-1, P11-2, P11-3, P11-4, P11-5, P11-6 and or P10-7.
3. (currently amended) A The material according to claim 1, wherein characterised in that the material comprises a self assembling peptide (SAP), wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.
4. (currently amended) A The material according to claim 3, wherein characterised in that the ratio of polar/neutral amino acids to charged amino acids is from 11:1 to 11:3.
5. (currently amended) A The material according to claim 3, wherein characterised in that the polar/neutral amino acids, which may be the same or different, and are selected from the group including comprise glutamine, serine, asparagine, glutamic acid, ornithine, cysteine, lysine, histidine and or threonine.
6. (currently amended) A The material according to claim 3, wherein characterised in that the amino acids are positively charged and form a gel at a pH of less than or equal to a neutral pH.
7. (currently amended) A The material according to claim 3, wherein characterised in that the amino acids are negatively charged and form a gel at a pH of greater than or equal to a neutral pH.

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8. (currently amended) A The material according to claim 3, wherein characterised in that the SAP is P11-1.

9. (currently amended) A The material according to claim 3, wherein characterised in that the amino acid chain is extended to include a bioactive peptide sequence.

10. (currently amended) A The material according to claim 3, wherein characterised in that the amino acid chain is attached to a therapeutically active molecule.

11. (currently amended) A The material according to claim 1, wherein characterised in that the material comprises an SAP which forms ribbons and/or fibrils in an aqueous solution and wherein the SAP has a primary structure in which at least 50% of the amino acids comprise an alternating structure of polar and apolar amino acids.

12. (currently amended) A The material according to claim 11, wherein characterised in that the polar amino acids include from 1 to 3 net charged amino acids per 11 amino acids.

13. (currently amended) A The material according to claim 12, wherein characterised in that the SAP is selected from the group P11-2, P11-3, P11-4 and or P11-5.

14. – 16. (canceled)

17. (currently amended) A The material according to claim 11, wherein characterised in that the material comprises a self assembling peptide (SAP) wherein the SAP forms a tape in an aqueous medium and is made up of 3 or more polar/neutral amino acids and a plurality of charged amino acids.

18. (canceled)

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19. (currently amended) A The material according to claim 11, wherein characterised in that the apolar amino acids, which may be the same or different, and are selected from the group including comprise phenylalanine, tryptophan, valine, leucine, isoleucine and or methionine.

20. (currently amended) A The material according to claim 17, wherein characterised in that the amino acid chain is extended to include a bioactive peptide sequence.

21. (currently amended) A The material according to claim 17, wherein 18 characterised in that the amino acid chain is attached to a therapeutically active molecule.

22. (canceled)

23. (currently amended) A The material according to claim 11, wherein characterised in that the SAP is soluble in a highly ionic medium.

24. (currently amended) A The material according to claim 23, wherein characterised in that the SAP comprises a ratio of net charged amino acids to total amino acids of from 1:11 to 4:11.

25. – 27. (canceled)

28. (currently amended) A The material according to claim 3, wherein 1 characterised in that the tapes are alternating peptide or complementary peptide tapes.

29. (currently amended) A The material according to claim 28, wherein characterised in that the complementary peptide tapes are made up of 3 or more polar amino acids of which some are charged amino acids wherein the ratio of charged amino acids to total amino acids is 3:11 or greater.

30. – 35. (canceled)

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36. (currently amended) A The material according to claim 1, wherein characterised in that the persistence length of the ribbons, fibrils or fibres is from 20 nm - 70  $\mu$ m.

37. (currently amended) A The material according to claim 36, wherein characterised in that the peptide is a P11-3 variant.

38. (currently amended) A The material according to claim 1, wherein characterised in that the material substantially comprises ribbons, fibrils, or fibres.

39. - 40. (cancelled)

41. (currently amended) A The material according to claim 38, wherein the material substantially comprises fibrils, and wherein 39 characterised in that the fibrils are comprised in a network of fibrils interconnected at fibre-like junctions.

42. (currently amended) A The material according to claim 1, wherein characterised in that a solution of the material has a nematic transition occurring at  $C_{IN} = 0.9$  mM.

43. (currently amended) A The material according to claim 38, wherein claims 39 or 40 characterised in that the fibrils or fibres are in the form of a nematic fluid.

44. (currently amended) A The material according to claim 43, wherein characterised in that the nematic fluid is an elastomeric gel.

45. (currently amended) A The material according to claim 1, wherein characterised in that the material is in the form of a tissue engineering scaffold.

46. (currently amended) A The material according to claim 45, wherein characterised in that the scaffold is seeded with cells.

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47. (currently amended) A The material according to claim 47, wherein characterised in that the cells may be are ligamentum cells for growing new ligaments, tenocytes for growing new tendon, chondrocytes for cartilage, osteoblasts for bone, cardiac cells for cardiac tissue engineering, stromal cells for tissue patches, fibroblasts and keratinocytes for skin and mesenchymal stem cells for any of these applications.

48. (currently amended) A The material according to claim 1, wherein characterised in that the material possess one or more of the features selected from high tensile strength at low weight, high modulus, high chemical resistance, high toughness, high cut resistance, low elongation to break, low thermal shrinkage, high dimensional stability, and flame resistant, or and self extinguishing.

49. (currently amended) A The material according to claim 1, wherein characterised in that the processed fibres possess characteristics selected from the following: continuous filament yarn, high tensile strength, processable on conventional looms, twisters, cord forming, stranding and serving equipment; staple, very high cut resistance, spun on conventional cotton or worsted spinning equipment, precision cut short fibres, processable on felting and spun lace equipment; pulp-wet and dry, floc, precision cut short fibres, high surface area, miscible in blend composites, thermal resistance, excellent friction and wear resistance; cord, high tensile strength and modulus at low specific weight, retention of physical properties at high and low temperature extremes, very low heat shrinkage, very low creep, good fatigue resistance; fabric, excellent ballistic performance at low weights; and excellent resistance to cuts and protrusion combined with comfortable wear and excellent friction and wear performance against other materials.

50. (currently amended) A The material according to claim 1, wherein characterised in that the material comprises a skin treatment.

51. (currently amended) A The material according to claim 50, wherein characterised in that the skin treatment comprises skincare and dermatological applications for cosmetic and/or medical treatment.

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52. (currently amended) A The material according to claim 50, wherein characterised in that the skin treatment comprises one or more of skin protection, improvement in skin feel, improvement of skin strength, increased suppleness, delivery of active or beneficial substances, moisturisation, improved appearance and/or anti-ageing effects.

53. (currently amended) A The material according to claim 1, wherein characterised in that the material comprises a hair care product.

54. (currently amended) A The material according to claim 53, wherein characterised in that the ~~that~~ the hair care product ~~comprises a hair care to improve~~ improves hair condition, strength, feel, suppleness, appearance and/or moisturisation.

55. (currently amended) A The material according to claim 54, wherein characterised in that the ~~that~~ the hair care product comprises a hair shampoo, conditioner, dye, gel, mousse and/or other dressing.

56. (currently amended) A The material according to claim 1, wherein characterised in that the material comprises a network adapted for the delivery of perfumes, vitamins and/or other beneficial agents to the skin and/ or hair.

57. (currently amended) A The material according to claim 56, wherein characterised in that pH responsiveness is used to control the delivery process.

58. (currently amended) A The material according to claim 1, wherein characterised in that the material is sterilised.

59. -- 60. (canceled)

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61. (currently amended) A method of tissue engineering, comprising seeding the material of claim 1 with cells which comprises the use of a SAP as a scaffold.

62. (canceled)

63. (currently amended) A The method of tissue engineering according to claim 61, wherein the method is a method of which comprises bone repair.

64. – 68. (canceled)

69. (currently amended) A method of sterilising a the material according to claim 1, comprising which comprises gamma irradiation of a dry powder of the material.

70. (canceled)

71. (currently amended) The use of a material according to claim 1, wherein the material can modify in the modification of the wetting properties or anti-icing properties of a material, for controlling the control interaction of oil/water with clay surfaces, the stabilising of stabilize clay itself or dealing with fractures in oil-wells.

72. (currently amended) The use of a material according to claim 1, wherein the material is part of a sensor, biocatalyst or in the manufacture of materials for use as sensors, as biocatalysts, or as separation media in biotechnology applications.

73. (currently amended) The use of a material according to claim 1, wherein the material is part of a in the manufacture of bioresponsive and biocompatible surfaces produced by adhesion, spreading and growth of endothelial cells in medical implant materials.

74. – 75. (canceled)

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76. (currently amended) The ~~use of a material according to claim 1, wherein the material can serve as a template for the nucleation and growth of inorganic materials.~~

77. - 80. (canceled)

81. (currently amended) The ~~use of a material according to claim 1, wherein the material comprises in the manufacture of a material selected from one or more of the following forms, continuous filament yarns, staple, floc, cord, or and fabric.~~

82. – 95. (canceled)

96. (currently amended) ~~A scaffold constructed using a combination of The material according to claim 1, further comprising a polymer and other existing commercial and/or naturally occurring polymers.~~

97. - 99. (canceled)

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Remarks

Claims 1-99 were pending. By this amendment, claims 14-16, 18, 22, 25-27, 30-35, 39-40, 59-60, 62, 64-68, 70, 74-75, 77-80, 82-95, and 97-99 are cancelled without prejudice to prosecution in another application. No claims were added. Therefore, claims 1-13, 17, 19-21, 23-24, 28-29, 36-38, 41-58, 61, 63, 69, 71-73, 76, 81, and 96 are now pending.

Claims were amended to comply with United States claiming practice, for example to correct antecedent basis and to amend use claims. Support for the amendment to claim 61 can be found throughout the application, for example page 15, line 16 – page 16, line 20.

By this amendment the specification has been updated to reflect prior related applications and to insert the abstract on a separate page, and the title of the invention has been amended.

No new matter has been added by this amendment.

Respectfully submitted,

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